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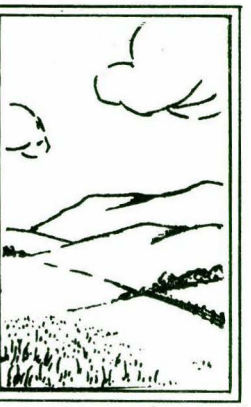
FOREST RESEARCH NOTES

U.S.DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CALIFORNIA FOREST AND RANGE
EXPERIMENT STATION *

STEPHEN N. WYCKOFF, Director



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A TRIAL OF THREE CHEMICALS AS RODENT REPELLENTS IN DIRECT SEEDING[1/]

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G. H. Schubert, Forester,
Division of Forest Management Research

Sodium fluoroacetate (compound "1080") and, to a lesser extent, red lead and zinc phosphide, have been suggested for use as rodent repellents in direct seeding. On the basis of a small test in 1950 on the Stanislaus Experimental Forest in California, none of these chemicals appears effective as repellents even though all three are effective as poisons.

Compound "1080", equivalent to 5 percent by weight of the carrier, was added to asphalt and to dowax (a commercial preparation). Dowax was used as the carrier for zinc phosphide and for red lead, which were used at the rates of 5 and 10 percent by weight of the carrier, respectively. Water was added to each mixture to form a thin paste. Seeds were then rolled in the repellent and allowed to dry to facilitate handling and to insure maximum retention of the chemical.

A total of 464 spots were planted with sugar pine seed at the rate of 5 seed per spot. Approximately one-fifth of the seed spots were protected with cone screens to determine the effect of the chemical on germination. Untreated seeds were planted on one hundred unscreened spots.

None of the chemicals tested proved effective as repellents. Only 2 percent of the unscreened spots with coated seeds were stocked in the fall of the first year, and this dropped to 1 percent at the end of the second year (Table 1). In contrast, stocking on screened spots with coated seeds averaged 88 percent at the end of the first growing season, and 80 percent at the end of the second year. Results for the control seed spots were similar.

1/ Mr. Joseph Keyes, retired, formerly Biologist, U. S. Fish and Wildlife Service, cooperated in the test by preparing the treated seed and helping with setting out of the seed spots.

* MAINTAINED AT BERKELEY, CALIFORNIA, IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA.

Agriculture--Berkeley

Table 1.--Percent of seed spots with one or more seedlings

Treatments	Stocked in 1950		Stocked in 1951	
	Screened	Unscreened	Screened	Unscreened
5 percent "1080" in asphalt	100	5	85	2
5 percent "1080" in dowax	85	0	80	0
5 percent zinc phosphide in dowax	80	0	80	0
10 percent red lead in dowax	93	2	71	2
Average, all coated seed	88	2	80	1
Control	80	4	75	2

Since rodents destroyed practically all seeds left unscreened, germination can be compared only on the screened seed spots. Seed treated with 5 percent "1080" in asphalt had the highest germination (54 percent). Those treated with 10 percent red lead in dowax had the lowest germination (43 percent). The untreated control seed germinated 48 percent. Those treated with 5 percent "1080" in dowax and with 5 percent zinc phosphide in dowax germinated 44 and 48 percent respectively. These differences are not statistically significant. The chemicals apparently neither repressed nor aided germination.

Empty seed coats, scattered in and around the seed spots indicated that rodents--white-footed mice (Peromyscus spp), chipmunks (Eutamias spp), and ground squirrels (Citellus spp)--and not birds had destroyed the seed. Evidently amounts of the coating substances too small to be repellent or lethal had been ingested by the rodents. A poison or repellent which could penetrate the seed coat and be absorbed in the endosperm without being detrimental to the embroyo would probably be a more effective means of rodent control. The substance, Tetramine, under current investigation by the U. S. Fish and Wildlife Service[2/], is believed to possess these properties. Tetramine is currently being tested by the California Forest and Range Experiment Station in the Douglas-fir area in California.

2/ Spencer, Donald A. and Nelson B. Kverno. 1952. Research in rodent control to promote reforestation by direct seeding. U. S. Fish and Wildlife Service. Progress Report No. 3, 74 p.